WHAT IS CLAIMED IS:

1. A method of sensing temperature comprising:

providing a temperature sensor including a matrix on a surface of a substrate, the matrix comprising a semiconductor nanocrystal in a binder;

irradiating a portion of the sensor with an excitation wavelength of light;

detecting emission of light from the sensor; and

determining the temperature from the emission of light from the sensor.

2. The method of claim 1, wherein the semiconductive nanocrystal includes a group II-VI semiconductor, a group III-V semiconductor, or group IV semiconductor.

3. The method of claim 1, wherein the semiconductor nanocrystal is ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, AlN, AlP, AlAs, AlSb, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, TlN, TlP, TlAs, TlSb or mixtures thereof.

4. The method of claim 1, wherein the semiconductor nanocrystal is overcoated with a second semiconductor material.

5. The method of claim 1, wherein the semiconductor nanocrystal includes an organic or organometallic overlayer, the overlayer making the nanocrystal soluble in the binder.

6. The method of claim 5, wherein the overlayer includes a hydrolyzable moiety.

7. The method of claim 6, wherein the hydrolyzable moiety includes a metal alkoxide.

8. The method of claim 1, wherein the binder includes an organic polymer.

9. The method of claim 1, wherein the binder includes an inorganic matrix.

10. The method of claim 1, wherein the nanocrystal is a member of a substantially monodisperse core population.

11. The method of claim 1, wherein the population emits light in a spectral range of no greater than about 75 nm full width at half max (FWHM).

12. The method of claim 1, wherein the population exhibits less than a 15% rms deviation in diameter of the nanocrystal.

13. The method of claim 1, wherein the nanocrystal photoluminesces with a quantum efficiency of at least 10%.

14. The method of claim 1, wherein the nanocrystal has a particle size in the range of about 15 Å to about 125 Å.

15. A temperature sensor comprising a matrix containing a semiconductor nanocrystal, the matrix formed from a semiconductor nanocrystal and a binder.

16. The sensor of claim 15, wherein the semiconductive nanocrystal includes a group II-VI semiconductor, a group III-V semiconductor, or group IV semiconductor.

17. The sensor of claim 15, wherein the semiconductor nanocrystal is ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, AlN, AlP, AlAs, AlSb, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, TlN, TlP, TlAs, TlSb or mixtures thereof.

18. The sensor of claim 15, wherein the semiconductor nanocrystal is overcoated with a second semiconductor material.

19. The sensor of claim 15, wherein the semiconductor nanocrystal includes an organic or organometallic overlayer, the overlayer making the nanocrystal soluble in the binder.

20. The sensor of claim 15, wherein the overlayer includes a metal alkoxide.

21. The sensor of claim 15, wherein the matrix includes an organic polymer.

22. The sensor of claim 15, wherein the matrix includes an inorganic matrix.

23. The sensor of claim 15, wherein the nanocrystal is a member of a substantially monodisperse core population.

24. A temperature-sensing coating comprising a matrix on a surface of a substrate, the matrix comprising a semiconductor nanocrystal in a binder.

25. The coating of claim 24, wherein the semiconductive nanocrystal includes a group II-VI semiconductor, a group III-V semiconductor, or group IV semiconductor.

26. The coating of claim 24, wherein the semiconductor nanocrystal is ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, AlN, AlP, AlAs, AlSb, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, TlN, TlP, TlAs, TlSb or mixtures thereof.

27. The coating of claim 24, wherein the semiconductor nanocrystal is overcoated with a second semiconductor material.

28. The coating of claim 24, wherein the semiconductor nanocrystal includes an organic or organometallic overlayer, the overlayer making the nanocrystal soluble in the binder.

29. The coating of claim 24, wherein the matrix includes an organic polymer.

30. The coating of claim 24, wherein the matrix includes an inorganic matrix.

31. The coating of claim 24, wherein the nanocrystal is a member of a substantially monodisperse core population.

32. A temperature-sensing paint comprising a semiconductor nanocrystal in a binder and a deposition solvent.

33. The paint of claim 32, wherein the semiconductor nanocrystal emits light independent of oxygen pressure and dependent upon temperature upon irradiation by an excitation wavelength of light.

34. The paint of claim 32, further comprising a pressure-sensitive composition, the pressure-sensitive composition emitting light dependent upon oxygen pressure upon irradiation by an excitation wavelength of light.

35. The paint of claim 32, wherein the pressure-sensitive composition includes a porphyrin.

36. The paint of claim 32, wherein the porphyrin is a platinum porphyrin.

37. The paint of claim 32, wherein the binder includes an organic polymer.

38. The paint of claim 32, wherein the binder forms an inorganic matrix.

39. The paint of claim 32, wherein the deposition solvent includes an alcohol.

40. The paint of claim 32, wherein the semiconductive nanocrystal includes a group II-VI semiconductor, a group III-V semiconductor, or group IV semiconductor.

41. The paint of claim 32, wherein the semiconductor nanocrystal is ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, AlN, AlP, AlAs, AlSb, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, TlN, TlP, TlAs, TlSb or mixtures thereof.

42. The paint of claim 32, wherein the nanocrystal is a member of a substantially monodisperse core population.

43. A method of manufacturing a temperature-sensing paint comprising combining a semiconductor nanocrystal, a binder, and a deposition solvent to form a paint.

44. The method of claim 43, further comprising preparing the semiconductor nanocrystal by contacting an M donor, M being Cd, Zn, Mg, Hg, Al, Ga, In, or Tl, with an X donor, X being O, S, Se, Te, N, P, As, or Sb to form a mixture; and heating the mixture to form the nanocrystal.

45. A method of manufacturing a temperature sensor, comprising:

depositing a temperature-sensing paint on a surface of a substrate, the temperature-sensing paint comprising a semiconductor nanocrystal in a binder, and a deposition solvent.

46. The method of claim 45, wherein the semiconductive nanocrystal includes a group II-VI semiconductor, a group III-V semiconductor, or group IV semiconductor.

47. The method of claim 45, wherein the semiconductor nanocrystal is ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, AlN, AlP, AlAs, AlSb, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, TlN, TlP, TlAs, TlSb or mixtures thereof.

48. A method of sensing temperature comprising:

providing a temperature sensor including a matrix on a surface of a substrate, the matrix comprising a semiconductor nanocrystal in a binder, the semiconductor nanocrystal including ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, AlN, AlP, AlAs, AlSb, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, TlN, TlP, TlAs, TlSb or mixtures thereof overcoated with a second semiconductor material and having an organic or organometallic overlayer, the overlayer making the nanocrystal soluble in the binder, the overlayer including a hydrolyzable moiety or a polymerizable moiety, the nanocrystal being a member of a substantially monodisperse core population;

irradiating a portion of the sensor with an excitation wavelength of light;

detecting emission of light from the sensor; and

determining the temperature from the emission of light from the sensor.